In the Claims

Delete Claims 1-16 without prejudice, and substitute new claims 17 – 37:

17. (New) A method of compensating for polarisation mode dispersion in an optical transmission fibre, comprises the step of:-
providing a length of optical fibre exhibiting high birefringence and having a fibre grating formed therein; and
adjusting a parameter of said fibre grating to impose a differential time delay on orthogonal polarisation states travelling in the fibre in order to compensate for dispersions of said orthogonal polarisation states travelling in the fibre.

18. (New) A method according to claim 17, wherein said step of adjusting a parameter of said fibre grating is responsive to a measurement of a difference in group velocities of said orthogonal polarisation states travelling within the fibre.

19. (New) A method according to claim 17, wherein said step of adjusting a parameter of the fibre grating comprises adjusting the pitch of said fibre grating.

20. (New) A method according to claim 17, wherein the optical fibre has a non-linear fibre grating formed therein.

21. (New) A method according to claim 17, wherein the optical fibre has a fibre Bragg grating (FBG) formed therein.

22. (New) A method according to claim 17, wherein it concludes the step of providing the optical fibre with a series of spaced apart heating elements formed therein such that energisation of at least one of the heating elements causes adjustment of a parameter of the fibre grating.

23. (New) A method according to claim 22, wherein it includes the step of selectively energising some of said heating elements to impose localised heating at selected parts of the optical fibre to cause adjustment of the parameter of the fibre grating.

24. (New) A method according to claim 22, wherein it includes the step of selectively energising some of said heating elements to establish a thermal gradient over said optical fibre to cause adjustment of the parameter of the fibre grating.

25. (New) A method as claimed in claim 17, wherein it includes the step of incorporating said high birefringence optical fibre into an optical transmission fibre at a transmission end of said optical transmission fibre.

26. (New) A method as claimed in claim 17, wherein it includes the step of incorporating said high-birefringence optical fibre into an optical transmission fibre at a receive end of said optical transmission fibre.

27. (New) A method as claimed in claim 17, wherein it includes forming said high birefringence optical fibre from a micro-structured optical fibre comprising one of a side hole fibre (SHF), a holey fibre (HF) and a photonic crystal fibre (PCF).

28. (New) A method as claimed in claim 27, wherein the high birefringence optical fibre is formed to have rods of a thermally sensitive material formed within the micro-structure of the fibre whereby adjustment of a parameter of the fibre grating is effected by subjecting said thermally sensitive rods to heat.

29. (New) A method of compensating for polarisation mode dispersion in an optical fibre transmission system, comprises the steps of:-

providing an optical transmission fibre;

incorporating into said optical transmission fibre a length of fibre exhibiting high birefringence relative to the birefringence of said optical transmission fibre, said length of high birefringence optical fibre having a fibre grating formed therein;

measuring a difference in group velocities of orthogonal polarisation states travelling in the optical transmission fibre; and

in response to said measurement of the difference in the group velocities, adjusting a parameter of the fibre grating in order to impose a differential time delay on said orthogonal

polarisation states travelling in the optical transmission fibre to compensate for polarisation mode dispersion caused by birefringence of the optical transmission fibre

30. (New) A method according to claim 29, wherein said length of high birefringence optical fibre is incorporated into a transmitter end of said optical transmission fibre.

31. (New) A method according to claim 29, wherein said length of high birefringence optical fibre is incorporated into a receiver end of said optical transmission fibre.

32. (New) An optical fibre for a polarisation mode dispersion compensation system, comprising; or
a length of optical fibre exhibiting high birefringence, said fibre having a fibre grating formed therein; and means integrated into the structure of said fibre responsive to heating for adjusting a parameter of said fibre grating such as to impose a differential time delay to orthogonal polarisation states travelling in the fibre.

33. (New) An optical fibre according to claim 32, wherein said adjustment means integrated into said fibre comprises a series of spaced apart heating elements along the length of said fibre.

34. (New) An optical fibre according to claim 32, wherein said fibre has a microstructure and said adjustment means comprises rods of thermally sensitive material formed within the microstructure of the fibre whereby heating of said rods causes a stretching of the fibre grating.

35. (New) An optical fibre for an optical fibre transmission system. comprises:-
a transmission optical fibre;
a length of optical fibre exhibiting high birefringence incorporated into said transmission optical fibre, said high birefringence optical fibre including a fibre grating formed therein;
means integrated into the structure of said high birefringence optical fibre responsive to heating in order to cause a parameter of said fibre grating to alter when said adjustment means is heated.

36. (New) An optical transmission system, comprising -

a transmission optical fibre;

a length of optical fibre exhibiting high birefringence incorporated into said transmission optical fibre, said high birefringence optical fibre having a fibre grating formed therein;

a sensor for measuring a difference in group velocities of orthogonal polarisation states travelling in the transmission optical fibre;

means for adjusting a parameter of the fibre grating in response to a measurement of a difference in the group velocities of orthogonal polarisation states travelling in the optical transmission fibre in order to impose a differential time delay on said orthogonal polarisation states to compensate for polarisation mode dispersion caused by birefringence of the transmission optical fibre.

37. An optical transmission system according to claim 36, wherein the means for adjusting a parameter of the fibre grating are integrated into the structure of the high birefringence optical fibre.